Similarly, body height and body weight have shown no close correlation with stomach size. The sex difference recorded above is no greater than sex differences in weights of other organs, and is considerably smaller than differences within each sex group. Therefore, it has been concluded that some other influence is largely responsible for determination of stomach size.

COMMENT

It is possible that functional factors may contribute to stomach size. This may bear a relationship to work performed similar to that suggested by Addis and co-workers[3,4] for the heart, kidney, liver, and gastrointestinal tract of experimental animals, but it has been impossible to demonstrate such an influence since no reliable information is available concerning the eating habits of the patients in this series. The stomach size bore no apparent relation to the nutritional state of the individuals.

Many diseases are represented in this series of cases, but most do not occur with sufficient frequency to permit valid conclusions regarding their relation to stomach size. No constant relationship to specific disease has been observed. Cases of carcinoma of the stomach, which greatly modifies the stomach size, have not been included in this series. Other gastric lesions were not obviously related to the size of the organ. Several stomachs exhibiting gastric ulcer showed little deviation from the average. As a group, the cases showing the changes of so-called chronic atrophic gastritis had normal sized stomachs, although two of four cases of pernicious anemia with severe mucosal changes had areas of 542 and 546 sq. cm. respectively. These were two of the three smallest stomachs in the series.

Two other groups of cases showed variations from the average stomach size which can only be mentioned because, due to the small number of cases, the significance of the differences is questionable. Stomachs from eight patients with diabetes mellitus had an average mucosal area which was 23 per cent greater than that of non-diabetic patients. In 17 stomachs from cases of chronic or healed duodenal ulcer, the average area was 9 per cent greater than that of cases without duodenal ulcer. There was no anatomical obstruction of the pylorus in any case. Clarification of the reasons for these apparent differences will require further observation.

SUMMARY

Measurements of mucosal area and total weight have been made in 126 human stomachs obtained at autopsy. Variations in stomach size are significant but cannot yet be explained. Differences in sex, age of patients, or body size do not account for the differences in the stomachs. Possible relationships to other conditions have been discussed.

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This government, with its institutions, belongs to the people who inhabit it. Whenever they shall grow weary of the existing government, they can exercise their constitutional right of amending it, or their revolutionary right to dismember or overthrow it.

—Abraham Lincoln, *Speech*, at first Republican State Convention in Illinois, 1856. Quoted by Theodore Roosevelt in address before Ohio Constitutional Convention, Columbus, February, 1912.

ANATOMICAL DEMONSTRATION OF THE ANOVULATORY MENSTRUAL CYCLE*

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IN 1923, George W. Corner,[1] and in 1927, Corner,[2] Carl G. Hartman,[3] and Edgar Allen[4] reported that recurrent hemorrhage from the healthy uterus occurred in the macacus rhesus without ovulation and in the absence of premenstrual changes in the endometrium. Corner[2] suggested the possibility that a similar type of menstruation might be found in women. Since these original publications, a large body of information on the anovulatory cycle of the monkey has been carefully accumulated.[5,6] Using the castrated monkey as experimental animal, Edgar Allen[4] demonstrated that discontinuation of estrogen treatment would result in menstruation and his observations became the basis for the estrin deprivation theory of menstruation. The similarity of the bleeding phenomena between the anovulatory and ovulatory menstruation was further emphasized and rather convincingly demonstrated in the experiments of Markee[7] who studied the bleeding mechanism in intraocular endometrial implants in both conditions.

In women, a small number of cases have been reported in which the examination of the pelvic organs free of pathology offered sufficient proof to make the diagnosis of an anovulatory cycle.[8,9,10] On the other hand, most of the textbooks on this and related subjects state that anovulatory cycles probably occur much more frequently and the condition has become a rather well recognized endocrine entity.[11,12] Statements as to the frequency of this type of menstrual cycle are of necessity vague, although clinicians usually point out that the incidence is probably higher during the first years following the menarche as well as during the period preceding the menopause. However, anovulatory cycles may be found at any time during the reproductive period of life. (Example. Case 8 of Bartelmez.)

REPORT OF CASE

The present report is of a 12 year old girl who came to autopsy 26 hours after a spontaneous intracerebral hemorrhage with no history of trauma. The girl had been well except for whooping cough at 5 and chicken pox and mumps between the ages of 6 and 8. Her menarche was 4 months prior to death, and four menstrual periods had been regular and without pain. Her last menstrual period was one week before death.

At autopsy, the girl was well developed including the secondary sex characteristics. She weighed 105 pounds and was 5 feet 2 inches tall. The brain showed a large defect in the frontal and parietal lobes filled with blood. The hemorrhage had occurred from one of multiple malformations in the wall of the cortical branches of the left middle cerebral artery. There was no evidence of trauma or previous hemorrhage. The remaining tissues and organs were normal although several sections taken from the aorta showed multiple microscopic areas of medial degeneration. Examination of the genital organs revealed the following: The uterus was normal, the length of the uterine body approximately equalled that of the cervical canal and cervix. The endometrium was regular, thin, and firm, measuring 1 mm. in thickness. The tubes were normal. The surfaces of the ovaries were smooth except for a small dimpled area in the left ovary. On sectioning, both ovaries contained numerous small cysts measuring up to 0.7 cm. in diameter. The left ovary contained a small yellowish structure which proved to be an old corpus luteum on histologic examination. The cysts were lined partly by healthy appearing granulosa cells, partly by granulosa cells showing karyorrhexis, and partly by theca interna cells. The cortical zone contained numer-

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ous primordial follicles and a small number of developing Graafian follicles. The predominant cell type in the anterior hypophysis was the granulated acidophil interspersed with small groups of granulated basophiles. The basophiles were somewhat more numerous at the periphery of the hypophysis.

COMMENT

This case demonstrates several features which permit the diagnosis of the anovulatory cycle. The patient falls in the age group in which this type of menstrual cycle supposedly is rather frequent, the menarche having been four months and one week prior to death. The history of regularly spaced menstrual periods and the finding of only one corpus luteum indicates that three out of the four periods occurred without preceding ovulation and that ovulatory and anovulatory cycles may follow in succession. In the absence of any pelvic pathology, including evidence of hyperplasia of the endometrium which is more common in the older age group,[12] it seems safe to assume that our patient had regularly recurrent hemorrhages from a healthy uterus without ovulation and corpus luteum formation.

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INTROSPECTION AND THE ORBITAL CORTEX*

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As the subject of cerebral cortical localization of function develops, each few years' innovations show new obstacles falling before the attacks of students. As would be expected, those functions which most definitely have appeared to be psychological have been the last to be physiologically understood. It now has become established that the orbital cortex, chiefly areas 11 and 12 of Brodmann, contains the neurograms of the cortical representative of personality, character and introspection—in short, patterns of the "self."

The entire neurogram system of personality and self is constituted of a hypothalamic, a thalamic and two cortical portions, a cingulate and an orbital component. In the lower animals there is no orbital fraction and the animals show practically no cortical modification of the instinctive personality. The anthropoids do have some orbital cortex but it is relatively rudimentary. Animals in general are spontaneous; they live for the moment; they do not show any signs of introspection and are apparently unconcerned with their origin or destiny. It would be both interesting and instructive, in fact of clinical value, if one could determine what cortical structure and what corresponding cerebral function distinguish man from animals.

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The researches of von Bonin[1] and of others doing cytoarchitectonic work have shown during the last few years that primates have areas of Broca which are well developed. In harmony with this, but as an entirely independent observation, Sanderson[2] has found that the gorilla in his natural haunts has "as many speech sounds and combinations as man." We are therefore compelled to conclude that speech is not entirely a human capacity.

COMPARISON OF HUMAN AND PRIMATE BRAINS

Comparison of human and primate brains shows clearly that the great difference in the cortex, as one ascends the scale, is in the size of the frontal lobes. Man has far more frontal cortex, even in proportion to total brain volume, than has the gorilla. Such an observation, however, proves nothing unless the situation is more clearly analyzed.

Analysis reveals that the gorilla has areas 6, 8, 9, 10, 44 and 47 in about as large a proportion for its brain as the human being possesses. These areas are concerned with movements, coördination and speech. But the orbital cortex, which is apparently concerned only with self, the relation of the individual to the environment, with introspection and personality, is particularly small in the gorilla and still smaller in the orangutan and chimpanzee. And it is exactly in these respects that man is superior. Comparison of gorilla brains with human brains in lateral silhouette shows the average human to be superior to that of the gorilla brain, but such a simple comparison is fallacious. The entire gorilla brain weighs less than half the average human brain. (Not more than 100 gorilla brains have been studied and it is quite possible that much larger ones do occur, but large human brains also are known.) The final correlation would have to be made by cytoarchitectonic comparisons. The general impression of such an authority as Tilney[3] is that the human brain is far superior.

Another criterion commonly used but exceedingly fallacious (in the sphere of function) is that of knowledge of paternity. All students are agreed that animals do not possess such knowledge; the male gorilla certainly does not know, or suspect, that he fathers the young. However, the lowest forms of human being also lack knowledge of paternity. Malinowski[4] has shown for the Trobriand Islanders and Daisy Bates[5] for the Australian aborigines that they do not know, and cannot be convinced, that children result from coitus. They believe that spirits cause pregnancy and that coitus is exclusively for pleasure. Some human beings, therefore, are not above the gorilla in such knowledge, but they are far superior in having thought about it and in having arrived at a belief which satisfies them.

SYNDROME OF THE ORBITAL CORTEX

There are in the literature about a dozen cases of accidental destruction of both orbital cortices in the adult human being. These cases show a typical syndrome which should enable the physician to establish the diagnosis. Case reports can be found in the large work of Kleist.[6] When the lesion is unilateral the matter is very uncertain because of the ability of the remaining cortex to carry on. Patients with bilateral lesions show character changes the basic element of which is the loss of self critique. But more fundamental than self critique is introspection, because one does not criticize what one does not inspect. The patients accept no discipline and if it is forced upon them they do not profit by it. They have no consideration for others, no self respect. As they have no self respect they have no pride and are not easily insulted. Kind advice has no lasting result. The patients characteristically lie and steal and have violent outbursts.

This syndrome has some resemblance to that of tumors